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Fish Stocking Assessment of Lions Lake, 2001

R. J. Zemlak and D. M. Cowie

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Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.com/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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Author(s): Randy J. Zemlak[1] and Dawn M. Cowie[1]
Address(es): [1] Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave., 3rd Floor, Prince George, B.C. V2L 3H9

105-02319/

LIONS LAKE

WATERSHED:	Parsnip River
DATE OF SURVEY:	September 26 and 27, 2001
FIELD CREW LEADER:	Randy J. Zemlak
FIELD ASSISSTANT:	Arne R. Langston

PEACE/WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

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MINISTRY OF WATER, LAND and AIR PROTECTION

ENVIRONMENTAL STEWARDSHIP DIVISION

REPORT PREPARED BY: RANDY J. ZEMLAK
DAWN M. COWIE

LAKE HISTORY

Lions Lake is a small lake located 11.5 km south of Mackenzie, BC (Figure 1). The lake has been surveyed in the past by the Ministry of Environment, Fish and Wildlife Branch (now Ministry of Water, Land and Air Protection) and by the Peace/Williston Fish and Wildlife Compensation Program (PWFWCP).

Initially, a stock assessment of "Lyon" Lake was conducted in 1984 but is only recorded as unpublished data sheets (Little 1984). Thirteen rainbow trout were captured in a gill net set and the results from this survey suggested that the lake should be inventoried in 1985 to determine any future enhancement possibilities for rainbow trout. In August 1985, a standard fisheries baseline reconnaissance level survey of Lions Lake was conducted by the Fisheries Branch of the Ministry of Environment (Philip 1985). No rainbow trout were captured in a similar overnight net set during this survey.

The information available on this lake around 1988/1989 is inconsistent but it is presumed that in order to facilitate the development of a recreational fishery in Lions Lake, an experimental stocking of either 1,000 or 5,000 rainbow trout fry was conducted. Also during the summer of 1989, the PWFWCP was requested to carry out an assessment on the feasibility of chemically treating Lions Lake with rotenone. The intent was to remove all fish species from the lake, allowing for a rainbow trout monoculture to be stocked. The assessment in 1989 was also aimed at expanding on previously collected data, while trying to identify an enhancement strategy for the lake (Jesson 1989).

While not thoroughly documented, the lake was not rotenoned and other enhancement opportunities were then sought. It is speculated that the addition of the chemical to the lake did not happen for two reasons: 1) the small marsh feeding into Lions Lake would have to be rotenoned too and would be met with limited success due to its floating organic mat, and 2) the high cost of the chemical itself required to accomplish killing off all fish in both lakes. Without the addition of rotenone to the lake, future enhancements conducted on the lake were then switched to the outlet stream.

In 1990, the beaver dam was removed on the outlet of the lake and there was construction of a bridge over the outlet stream. Then in 1991, habitat complexing, bank stability and spawning gravel was added to the stream. In addition, improvements to the approach of the bridge was conducted. A summary report by Langston (1991) provides a more detailed list of the enhancements that took place on the outlet creek.

According to the British Columbia Release Records Database, Lions Lake was first stocked with rainbow trout in 1988. The next stocking was in 1992 and has then been stocked annually. During September 2001, PWFWCP fish biologists re-investigated Lions Lake primarily to evaluate the success of the current fish stocking program and to determine if changes to the stocking program were required. All of the above reports can be viewed at the PWFWCP office (address on cover page).

Lake: **Lions**

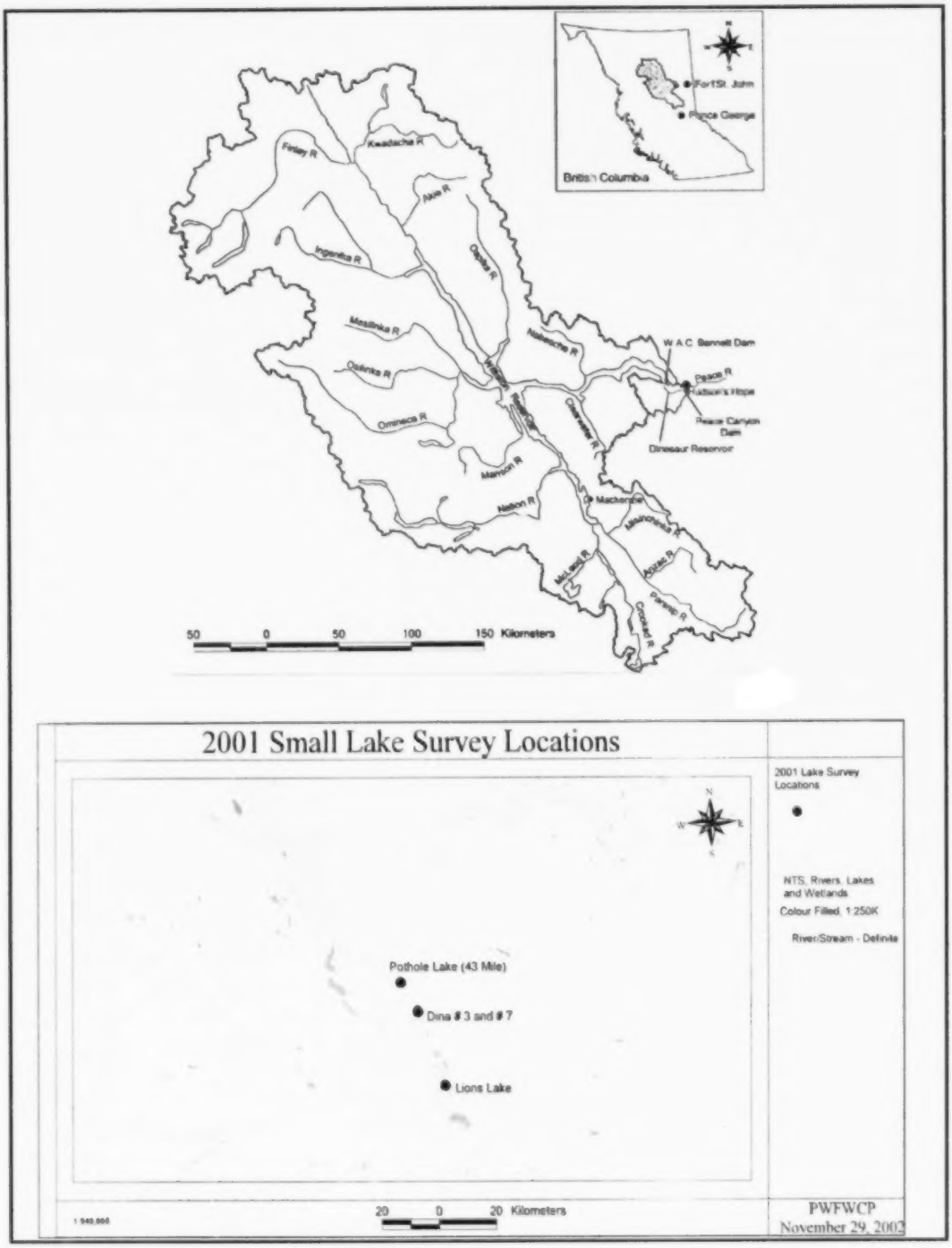

Figure 1. Location of Lions Lake.

Lake: **Lions**

LAKE LOCATION

Location:	11.5 km south of Mackenzie BC
Elevation:	± 690 m
Latitude/Longitude:	55° 15' 05" : 123° 06' 40"
U.T.M.:	10.0492937.6122772 (NAD 1983)
Management Unit:	7-30
N.T.S. Map No.:	93 - O/3
Watershed:	Parsnip River
Waterbody Identifier:	00958PARA
Lake Drainage:	open system (4 inlets + 1 outlet)

ACCESS

Although access to Lions Lake has not changed significantly since the original reconnaissance level lake inventory, exact road directions and conditions may have changed over time. From the junction of the Mackenzie Boulevard and Centennial Drive (Mackenzie, BC), drive 10.4 km south on Mackenzie Boulevard / Hwy 39. Turn right on an unnamed access road and drive 1.0 km west (keep straight of intersection after 0.3 km). Turn left onto the lake access road and drive 100 m to the Lions Club recreation site.

STOCKING HISTORY

Rainbow Trout

Lions Lake was initially stocked with 5,000 rainbow trout in 1988 (Table 1). According to the Release Records Database (MWLAP), rainbow trout are the only species of fish to be stocked in Lions Lake. Since that time, there have been 9 other stocking efforts.

Table 1. Lions Lake Rainbow trout stocking history.

Year	Number	Size (g)	Life Stage	Stock
1988	5,000	22.2	UN	Tunkwa
1992	5,000	6.6	YE	NRT Premier
1993	5,055	19.6	YE	Blackwater
1994	5,000	17.5	YE	Blackwater
1996	5,000	27.6	YE	Blackwater
1997	5,000	24.5	YE	Blackwater
1998	5,000	10.4	YE	Blackwater
1999	5,000	23.7	YE	Blackwater
2000	5,000	28.9	YE	Blackwater
2001	5,000	25.6	YE	Blackwater

The stocking frequency for this lake is annual with 5,000 natural rainbow trout. The average size of these fish has been about 20 to 25 g.

METHODS

Three different techniques were used to determine relative abundance of fish species in Lions Lake. Conversations with MWLAP fish biologists prior to the gill netting effort suggested that it would be valuable to have at least 10 fish sampled from each age group to accurately provide future recommendations to the stocking program. Therefore, it was deemed necessary to keep the nets in the water overnight if the day sets produced few rainbow trout. Two gill nets were used to evaluate the population structure of fish in Lions Lake. Net one consisted of six different sized mesh panels ranging from 25 to 85 mm. Each panel is 15.24 m long and 2.4 m wide. This net was set twice, with the first set remaining over night. The second net was a single panel gill net, 19 mm, 15.24 m long and 2.4 m wide. The intentions of this small single panel was used to further verify any small sized fish species within the lake.

The second method used was Gee traps. Each Gee trap (two in total) was baited with sardines and set overnight. The Gee traps were set in shallow (< 2 m) littoral habitat. The third technique used to capture fish was angling gear. A spin cast rod with an assortment of lures and a fly rod with dry flies were utilised. Angling efforts by PWFWCP fish biologists were also recorded to determine additional catch per unit effort (CPUE).

The whitefish and trout captured were measured for fork length and weight. A biological examination of the fish was conducted which revealed it's sex, maturity, stomach contents, and disease/parasite presence. Scale samples were collected for age determination and analysis was performed by North/South Consultants (NSC). General appearance of the fish was determined through visual analysis. Photos of many fish species were taken and are on file.

The habitat features of Lions Lake were briefly assessed. The entire perimeter of the lake was observed to confirm the four inlets and one outlet stream. A physical description of each stream was documented and examined for fish utilization.

The benchmark set during the original study (1991) was located. Changes to the current water level was measured with a clinometer, 1.5 m staff, and a 30 m Eslon tape. Photo documentation was taken of the lake as well, but is not presented in this report.

A limnology station was established at the deepest part of the lake to record the water temperature and dissolved oxygen of the lake at varying depths. A YSI model 58 oxygen/temperature meter was used for the limnological profile. Depth, oxygen, and temperature were recorded from the surface to the bottom at 1.0 meter intervals. Time and weather conditions were also recorded.

RESULTS

Gill Nets

The first two net sets were deployed during the day and then left overnight on September 26, 2001. Net set #3 was set only during the day on September 27 (Figure 2, Appendix 1). The nets were checked periodically throughout the day for fish presence. Gill net #1, set for 25.10 hours, produced 1 rainbow trout, 20 lake whitefish, 6 mountain whitefish, 16 largescale/white suckers (plus one additional fish that escaped), and 17 northern pikeminnows. The CPUE for rainbow trout yielded 0.04 fish per net-hour. Gill net #2, set for 24.45 hours, produced no fish. Gill net #3, set for 3.25 hours, produced no rainbow trout but did produce 2 northern pikeminnows, 5 lake whitefish, and 5 mountain whitefish.

The identification of suckers to the species level could not be conducted with certainty. Some physical characteristics matched white suckers while other physical characteristics matched that of the largescale species. These two species have been known to interbreed within this area of the Williston watershed and makes proper identification difficult (Dr. Don McPhail, UBC Fish Museum, pers. comm.). Further investigation would be required to determine which or perhaps both species inhabit Lions Lake.

Angling

On September 26, PWFWCP fish biologists angled for 2.5 hours using two rods and yielded two rainbow trout. Each rod produced one fish. Catch per unit effort is 0.4 fish per rod-hour.

Lake Catch Summary

All fish species captured (Table 2), were enumerated and measured for fork length (cm). Slightly more fish were captured during the overnight net set as oppose to the day time net set. Only three rainbow trout were captured with the combined efforts of angling and nets.

Table 2. Gill net and angling catch summary for Lions Lake, 2001.

Species	Net Site Number			Angled	Total Number	Number Sampled	Size Range (cm)
	1	2	3				
RB	1	0	0	2	3	3	17.0 – 22.0
MW	6	0	5	0	11	11	28.4 – 34.5
LW	20	0	5	0	25	25	16.8 – 35.5
NSC	17	0	2	0	19	17	13.0 – 40.4
SU	16	0	0	0	16	16	24.4 – 39.8

Lake: **Lions**

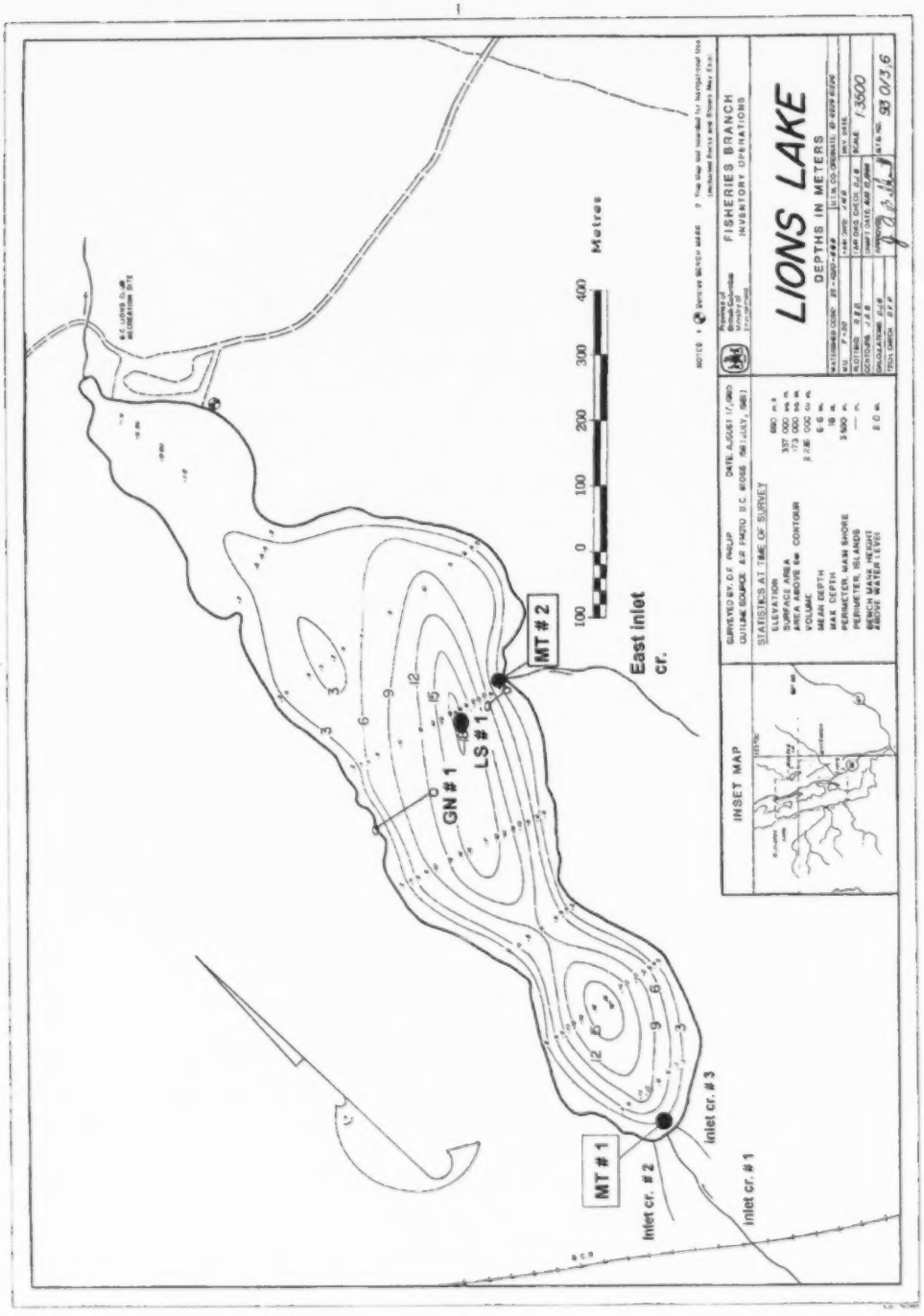

Figure 2. Location of gill net sets, Gee traps, and limnology station on Lions Lake, 2001.

Gee Traps

Two Gee traps were used to capture juvenile fish. The traps were set overnight (Figure 2) for a minimum of 23 hours (Table 3). Trap #1 produced 1 prickly sculpin, 25 lake chub, 3 northern pikeminnows, and 1 redside shiner. Trap #2 produced 6 northern pikeminnows, 13 lake chub, and 1 sucker. One of the traps was then reset (trap #3) for a period of 5.45 hours but produced no fish. The intent here was to try and verify two other species known to inhabit the lake: burbot (Little 1984), and slimy sculpins (Philip 1985).

Table 3. Gee trap results, 2001.

Trap No.	Hours fished	Depth (m)	Substrate	Species	Number	Size Range (mm)
1	23.03	0.8 m	organics/aquatic plants	CAS	1	61
				LKC	25	54-78
				NSC	3	55-82
				RSC	1	67
2	23.03	0.5 m	aquatic plants/ organics	LKC	13	57-78
				NSC	6	48-90
				SU	1	99
3	5.45	0.8 m	gravel/small cobble	none	0	n/a

Limnology

A limnology station was established at the deepest part of the lake (Figure 2). Depth, water temperature, and dissolved oxygen measurements were taken (Table 4).

Table 4. Limnology Profile for Lions Lake (1985 and 2001).

Depth (m)	Dissolved Oxygen (1985)	Dissolved Oxygen (2001)	Temperature (2001) (degrees Celsius)
Surface	8.9	9.0	13.3
1	9.0	8.8	13.3
2		8.8	13.1
3	9.1	8.8	13.0
4		8.4	12.9
5	9.2	8.3	12.8
6	9.1	7.9	11.6
7	8.0	6.7	9.5
8	5.8	5.0	7.5
9		3.8	6.5
10	3.8	2.5	5.9
11		1.3	5.4
12	2.5	0.7	5.1
13		0.4	4.7
14	0.4	0.3	4.6
15		0.2	4.5
16	bottom	0.2	4.5
17		0.1	4.5
18		bottom	bottom

The O_2/temp profile was completed on September 26, 2001 at 1040 hours. Conditions were calm with 100% cloud cover. Our oxygen readings showed a similar pattern to the 1985 survey. However, the readings in 2001 were not as much at the deeper depths (> 6 m). Anoxic conditions for trout start around the 8 m depth. While the readings taken in 1985 and 2001 were at different times of month, the temperature readings also showed a similar pattern (again slightly cooler later in the year).

BIOLOGICAL ANALYSIS OF RAINBOW TROUT

Of the three rainbow trout captured (one from gill nets, two from angling), all were measured for fork length and weight (Appendix 2). A biological analysis was conducted on all rainbow trout. All fish caught were females and reproductive organ analysis revealed that all were immature fish. Examination of stomach contents suggest that rainbow trout are preying primarily on zooplankton. Other common food included beetles and worms. External examination indicated healthy fish. Internal examination revealed tapeworms in one of the rainbow trout.

Age determination on two of these fish by NSC revealed that they were both 2 year olds (Appendix 2). The third fish's scale could not be read due to a poorly developed focus (re-generated). Prints of the scales (on file) and age markings were provided and reviewed by PWFWCP fish biologists and no obvious errors were detected.

BIOLOGICAL ANALYSIS OF NON-GAME FISH

A biological analysis was conducted on a few northern pikeminnows, 11 mountain whitefish, and 25 lake whitefish (Appendix 2). Stomachs were thoroughly examined for contents.

Six of the largest northern pikeminnows were sacrificed to specifically examine stomach contents. These fish have the ability to prey upon newly stocked rainbow trout fry and we wanted to examine to what extent that this may have happened. Of these fish, only one of them had a fish (unidentified) contained within its stomach. Further examination revealed a variety of prey including caddisflies, detritus, and one baby mouse. Three of these fish's stomachs were empty.

Of the eleven mountain whitefish sampled, reproductive organ analysis revealed that 7 were maturing females, 5 of which contained large eggs and may spawn this year and 4 were maturing males. Examination of stomach contents suggest that mountain whitefish are preying primarily on zooplankton. Other common foods included clams, insects and snails. External examination indicated healthy fish. Internal examination revealed tapeworms in one of the mountain whitefish.

Of the 25 lake whitefish, the population was almost an even split of males and females, with 13 females, 11 males, and 1 unknown. Reproductive organ analysis revealed that all 13 females were maturing, with 3 containing small eggs. Eight of the males were maturing and 3 males were immature. The one unknown lake whitefish was immature. Examination of stomach contents indicate that lake whitefish are also preying primarily on zooplankton. Other common foods included aquatic plants and detritus. External examination indicated healthy fish. Internal examination revealed tapeworms in 3 lake whitefish and 10 lake whitefish had parasites in the body cavity.

DRAINAGE

Lions Lake is an open system, with four inlets and one outlet (Figure 2). The outlet is located at the northern end of the lake and flows into Gagnon Creek. The mouth of the outlet has large amounts of woody debris but appears to still allow access for rainbow trout. The outlet, from the lake to 30 m downstream of the bridge, consists of mainly a silt and sand substrate. Downstream of this point, there was marginal spawning substrate present. Measurements taken at the bridge indicated a wetted width of 2.0 m, an average depth of 4 cm (a maximum of 20 cm), and an estimated velocity of 0.75 m/second. The outlet at this point is 90% riffle/glide. Small fry were observed but not caught or identified.

The first inlet (East Inlet) is located on the eastern shore in the centre of the lake. There is no detectable flow for the first 30 m and it contains an organic substrate. Upstream of the 30 m mark is a series of active beaver dams, which are a barrier to fish passage. The height of the first dam is 0.8 m and the length is unknown as the dam is too overgrown to assess fully. There is no fish use below or above these dams.

The southern portion of the lake contains the remaining three inlets. Inlet #1 is the centre inlet and has very little flow over an organic substrate. The average width was 50 cm with an average depth of 2 cm. No fish were observed in the creek. Inlet #2 (west of Inlet #1) has an old beaver dam approximately 40 m upstream of the lake. This inlet has an organic bottom, an average width of 70 cm, and an average depth of 25 cm. There was very little flow and no apparent fish use. Inlet #3 (east of Inlet #1) has a small fall (0.5 m high) 10 m from the lake confluence. Inlet #3 has an average width of 60 cm, an average depth of 6 cm, and an organic bottom which has little potential fish use.

BENCHMARK

The original benchmark was relocated (Figure 2). It is situated on the northeast shore, 30 m south of the access road near the Lions Club Recreation site. The iron spike from the original survey (1985) was bent over and would appear to be overgrown by the tree in the near future. As a result, another iron spike was placed right next to the existing spike. The benchmark was originally set at 2.0 m above the lake water level. In 2001, the water level was at 2.11 m, indicating a 11 cm drop from 1985. One reason for this drop in lake level

over time would be contributed to the removal of the beaver dam on the outlet in 1990. This benchmark is located in a 15 cm D.B.H. white spruce tree, 10.2 m from the current water level at the time of this survey.

FISHERIES MANAGEMENT COMMENTS

Rainbow Trout

Lions Lake does not appear to support a successful population of stocked rainbow trout as the number of fish captured during this survey is low compared to the number of fish stocked each year. The reasons for the lack of success have not been determined; only inferences can be made as to why the stocked rainbow trout are not abundant in Lions Lake.

One of the possible reasons the stocked rainbow trout are not creating a recreational fishery in Lions Lake may be due to the history of poor oxygen levels contained within the lake. This lake appears to have poor oxygen levels past a certain depth (Philip 1985). In August 1985, oxygen levels at 10.0 m were recorded at 3.8 mg/L. Close to half of the lake contains oxygen levels lower than the minimal required for trout (at least for certain times of the year). Therefore, only half of the lake appears to be available for these fish to inhabit. During ice-on conditions, there is potentially for even less available space for these fish and the population of rainbow trout in Lions Lake could have experienced a winterkill situation. In addition, no winter oxygen readings have been conducted on this lake; such a survey may further explain what is happening year after year within the lake.

Lions Lake appeared to originally contain a natural population of rainbow trout in 1984. An assessment on the lake at that time produced 13 rainbow trout. These fish could have originally come from Gagnon Creek which contains a naturalized population of rainbow trout. What remains a mystery is why the 1985 survey didn't capture any rainbow trout. The same amount of time and an overnight net set was used on both occasions. This scenario suggests that something may have happened (possibly winterkill) with the lake during that one year span.

Lions Lake contains a diverse array of fish species and there could be a competition problem for food sources. Of all of the fish species examined for stomach contents, there was a wide variety of food items consumed (especially zooplankton and insects). These same items would also be consumed by rainbow trout throughout all of its life stages as well.

In addition to food competition, there could be a predation problem for the rainbow trout. Northern pikeminnows can be piscivorous at times and have been known to prey upon newly stocked fry. Of the six pikeminnows observed for stomach contents, only one consumed a fish. Lions Lake is already being stocked with a hardier stock of rainbow trout (Blackwater). This stock is better known to exist with the northern pikeminnows but this does not appear to be the case in Lions Lake.

The net CPUE for rainbow trout was barely higher in 2001 than compared to the 1985 results. In 1985, gill net #1 yielded 0 rainbow trout per net-hour. In September 2001, gill net #1 produced 0.04 rainbow trout per net-hour. Although gill net #1 was set in the same location between years, the dates (time of year) the net was set are different.

Non-game fish

Lions Lake also supports populations of non-game fish including mountain and lake whitefish, largescale and/or white suckers, prickly sculpins, northern pikeminnows, redside shiners, and lake chub. Although not all populations were studied intensively, all non-game fish species were abundant and appear to be relatively healthy (other than redside shiners, prickly sculpins, and burbot). About half of the lake whitefish had either parasites (10 fish) or tapeworms (3 fish). There was evidence of black spot disease in a few lake chub samples. We did not verify that burbot or slimy sculpins inhabit the lake with this 2001 lake survey.

MISCELLANEOUS COMMENTS

1. Photographs of Lions Lake were taken of some fish species and the surrounding habitat. Numerous photos were taken of the difference in size of mountain and lake whitefish eggs and of their key external identification features (dorsal rays and body profile). Most photos are not significant to the relevance of this report on fish stocking. Therefore, these photos are not displayed in this fish stock assessment report but can be viewed at the address indicated at the beginning of this report.

2. Numerous types of enhancements have taken place on Lions Lake and the outlet creek. Projects include things such as outlet creek relocation, bridge replacement, slope stabilization, spawning substrate placement, and beaver dam removal on the inlet streams. The 1991 Lions Lake Outlet Habitat Improvement Summary provides details of the enhancements that occurred on the outlet creek.

3. In the 1989 Technical Aspects of the Chemical Treatment of Lions Lake and Proposed Lions Lake Management Plan, there was discussion of a coarse fish barrier and Pesticide application of Noxfish. Although not documented, the application of this pesticide did not happen.

FISH STOCKING PROGRAM

Rainbow Trout

The current rainbow trout stocking program in Lions Lake appears to be unsuccessful for a number of possible reasons. There could be many different factors which are affecting the success of the rainbow trout stocking over the past number of years. While the exact reasons are not known, it is recommended that stocking of rainbow trout cease in Lions Lake. The fish designated for this particular lake could then be put towards another lake that is more suitable for stocking purposes.

LITERATURE CITED

Langston, A.R. 1991. Lions Lake Outlet Habitat Improvement Summary. Peace/Williston Fish and Wildlife Compensation Program (PWFWCP), Prince George, BC. 3pp plus photos.

Little, B. 1984. Lyon Lake - Stock Assessment. Unpublished Data Sheets located at Fisheries Section, Fish and Wildlife Branch, Prince George, BC.

Jesson, D. 1989. Technical Aspects of the Chemical Treatment of Lions Lake and Proposed Lions Lake Management Plan. Peace/Williston Fish and Wildlife Compensation Program (PWFWCP), Prince George, BC. 7pp plus appendices.

Philip, D.F. 1985. A reconnaissance survey of Lions Lake. Fisheries Branch, Ministry of Environment, Prince George, BC. 21pp plus appendices.

Lake: **Lions**

APPENDIX 1

Netting Record

Lake: **Lions**

NETTING RECORD **September 26 to 27, 2001**

NETTING SITE #1 Mesh sizes experimental order: 25, 76, 51, 89, 38, 64 mm (6 panels)

Type:	Sinking monofilament gill net		
Date Set:	September 26, 2001	Time:	1020 hrs
Date Lifted:	September 27, 2001	Time:	1130 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	0.6 m aquatic plants/SWD
Deep End Mesh Size:	64 mm	Depth: Substrate:	12.0 m unknown

Comments:

Net was checked at 1625 hrs on September 26; caught 4 mountain whitefish, 1 northern pikeminnow, 10 lake whitefish, and no rainbow trout. Reset net overnight. Net pulled on September 27 and produced one rainbow trout, 16 suckers (largescale and/or white), 16 northern pikeminnows, 10 lake whitefish, and 2 mountain whitefish. Gill net #1 produced a total of one rainbow trout.

NETTING SITE #2 Mesh sizes: 19 mm (1 panel)

Type:	Sinking monofilament gill net		
Date Set:	September 26, 2001	Time:	1105 hrs
Date Lifted:	September 27, 2001	Time:	1150 hrs
Net Dimensions:	Length: 15.24 m	Depth:	2.4 m
Shallow End Mesh Size:	19 mm	Depth: Substrate:	5.0 m unknown
Deep End Mesh Size:	19 mm	Depth: Substrate:	8.0 m unknown

Comments:

Net was pulled on September 26th at 1632 hours and produced no fish. Net was reset overnight. Net was then pulled on September 27th and no fish were captured.

Lake: **Lions**

NETTING RECORD **September 27, 2001**

NETTING SITE # 3 Mesh sizes: 25, 76, 51, 89, 38, 64 mm

Type:	Sinking monofilament gill net		
Date Set:	September 27, 2001	Time:	1145 hrs
Date Lifted:	September 27, 2001	Time:	1510 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth: Substrate:	0.5 m organics/SWD
Deep End Mesh Size:	64 mm	Depth: Substrate:	12.0 m unknown

Comments:

Net set on morning of September 27. Net pulled at 1510 hours and not reset. Net produced 2 northern pikeminnows, 5 mountain whitefish, 5 lake whitefish, and no rainbow trout.

Lake: **Lions**

APPENDIX 2

Individual Fish Data

Lake: **Lions**

INDIVIDUAL FISH DATA

Date Captured: September 26, 2001
Angling plus Gill Net # 1 (1st pull)

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Method of Capture: Sinking monofilament gill net.

Species	Fork Length (cm)	Weight (grams)	Gonadal Maturity	Sex	Sample Type	Age (yrs)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
RB	20.1	82	IMM	F	SC	?	lots of zooplankton				Angled; tapeworms in body cavity;
RB	22.0	99	IMM	F	SC	2	zooplankton		clams	snails	Angled
NSC	36.6	623	MG	M				worm			
MW	30.2	379	MG	F					clams	detritus	large eggs; could spawn this yr.
MW	31.0	392	MG	F							large eggs; could spawn this yr.
MW	32.8	491	MG	F							large eggs; could spawn this yr.
LW	34.5	543	MG	F							large eggs; could spawn this yr.
LW	30.6	370	MG	F							small eggs, somewhat loose in skin
LW	33.6	488	MG	F							
LW	24.7	175	IMM	M							
LW	35.5	553	MG	F							
LW	32.5	424	MG	F							
LW	33.3	457	MG	M							parasite in body cavity
LW	34.0	473	MG	M							
LW	33.4	445	MG	F							
LW	33.2	476	MG	F							
LW	33.9	481	MG	M							parasites

Lake: **Lions**

INDIVIDUAL FISH DATA
Net Set # 1 Continued

Date Captured: September 27, 2001
Gill Net # 1, second pull

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Method of Capture: Sinking monofilament gill net.

Species	Fork Length (cm)	Weight (grams)	Gonadal Maturity	Sex	Sample Type	Age (yrs)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
RB	17.0	55	IMM	F	SC	2		beetle, worms		detritus	
LW	34.2	511	MG	F			full of zooplankton				small eggs
LW	32..5	443	MG	F							parasites
LW	33.6	496	MG	M							
LW	23.4	145	IMM	M			orange zooplankton			aquatic plants	
LW	31.7	404	MG	F							parasites
LW	16.8	53	IMM	?							
LW	31.3	401	MG	F			orange zooplankton			aquatic plants	parasites
LW	33.0	460	MG	M						aquatic plants	parasites
LW	33.9	475	MG	M			zooplankton				parasites/ tapeworms
LW	33.4	494	MG	F			zooplankton				parasites
MW	28.1	272	MG	M			zooplankton				tapeworms
MW	28.9	321	MG	M						aquatic plants; snail; green ooze	

Lake: **Lions**

Gill Net #1 results continued:

16 northern pikeminnows:

Maximum length = 404 mm
Mean length = 242 mm
Minimum length = 130 mm

16 suckers (either largescale and/or white):

Maximum length = 398 mm
Mean length = 312 mm
Minimum length = 244 mm

Also released 2 lake whitefish alive (no samples taken).

Lake: **Lions**

INDIVIDUAL FISH DATA

Date Captured: September 27, 2001
Gill Net # 3

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

EG - Egg
ML - Milt
HD - Head
TG - Fish Tag
ST - Stomach

SC - Scale
FR - Fin Ray
OT - Otolith
WF - Whole Fish

Method of Capture: Sinking monofilament gill net.
Condition Factor (K) = $W / L^3 \times 100$

Species	Fork Length (cm)	Weight (grams)	Gonadal Maturity	Sex	Sample Type	Age (yrs)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
MW	33.8	519	MG	F			green zooplankton				big eggs loose in skein
MW	30.9	363	MG	F				insects		detritus	
MW	32.2	436	MG	F			green ooze	caddis			
MW	29.6	327	MG	M			orange zooplankton				
MW	28.4	274	MG	M			zooplankton			snail	
LW	31.3	359	MG	M							parasites; empty
LW	32.9	455	MG	F						detritus	small eggs; parasite
LW	25.8	191	IMM	M			orange/ green zooplankton				
LW	32.6	435	MG	M			zooplankton				
LW	32.9	434	MG	M			little zooplankton				tapeworms

Also captured:

2 northern pikeminnows:

1 was released alive

other one was 395 mm in length and had an empty stomach

Lake: **Lions**

AGE DETERMINATION COMPLETED BY:

North/South Consultants
Paul Graveline
83 Scurfield Blvd.
Winnipeg, Manitoba, R3Y 1G4